

## A NEW GENUS *HERIMOSA* (LEPIDOPTERA: HESPERIIDAE: TRAPEZITINAE) AND ITS RELATIONSHIP TO THE *PROEIDOSA* GROUP OF ENDEMIC AUSTRALIAN SKIPPERS

ANDREW ATKINS

*The University of Newcastle, New South Wales, 2308*

### Abstract

*Herimosa* gen. n. is proposed for the Australian endemic skipper *Anisynta albovenata* Waterhouse. The immature stages and adults of this cryptic species are described and illustrated. Both adult and immature structures show that *A. albovenata* belongs with the *Proeidosia* group of genera and not with *Anisynta*, a genus of small, moderately robust skippers. *Herimosa* is defined, and illustrated comparisons of adult structures are made with those of *Anisynta cynone* and *Croitana croites*. It is also compared with the more distantly related *Mesodina*. *Herimosa* is more closely related to the proeidosine genus *Croitana*. The randomly shared and generalised characters of the *Proeidosia* group indicate that it is a diverse and archaic assemblage of the Trapezitinae. A key to the *Proeidosia* group of genera is given, which is revised to accommodate the new genus.

### Introduction

On the 13th October, 1940 several specimens of a distinctive skipper were collected by M.W. Mules at 'Point Pierce, Yorke's Peninsula' South Australia. The skipper was named *albovenata* (the veins of the underside of the hindwing are finely traced with white scales) and assigned to the endemic genus *Anisynta* Lower by Waterhouse (1940) with the following comment.... 'The species is a typical *Anisynta* and allied to *A. cynone gracilis* Tepper 1882, but larger.'

Fisher (1978) described the life history, and included photographs of the juvenile stages, which can be compared with those of *A. cynone* illustrated in the same publication. The eggs, larvae and pupae of both skippers differ significantly. Those of *cynone* are typical of the genus (see also Atkins 1975), while those of *albovenata* resemble species of the *Proeidosia* group (Atkins, 1973, 1984). Adults also differ. Both sexes of *cynone* have moderate labial palpi, short wings and short, moderately stout bodies, whereas *albovenata* has long, slender labial palpi, and (more noticeable in females) long narrow wings and a larger abdomen. These characters, together with the presence of two forewing subterminal spots, are consistent with species of the *Proeidosia* group (see Atkins 1984).

Within the Trapezitinae, the *Proeidosia* group contains three divergent genera, *Proeidosia* Atkins, 1978, *Croitana* Waterhouse, 1932 and *Antipodia* Atkins, 1984, which share unspecialised adult and juvenile structural characters. As well as distinctive wing maculations, the adults have distally constricted valvae in the male genitalia, and a broad spherical caudal chamber, with the lamella antevaginalis plate and accessory pouch of the ductus bursae weakly developed or absent in the female. Distinguishing features of the juveniles include a broad egg, moderately slender, tapered larva and pupa, and an unusual manner of concealment - head downwards within a woven conical shelter made from leaves of the grass and sedge foodplants (Atkins 1973, 1984; Atkins & Miller 1987).

*Anisynta* is, by contrast, trapezittine in form (Waterhouse 1932). The egg is small and heavily ribbed. The larva and pupa are short and stout, and are concealed in loosely woven shelters found upright or horizontally among grass foodplants, or among debris nearby. The male genitalia have elongate, overlapping valvae that lack a dorsal process, and the female genitalia have a narrow caudal chamber with the lamella antevaginalis plate and accessory pouch strongly developed (Atkins, unpublished).

In this paper *Anisynta albovenata* is transferred to the *Proeidosa* group in the new genus *Herimosa*.

Acronyms: AM = Australian Museum, Sydney; SAM = South Australian Museum, Adelaide.

### Genus *Herimosa*\* gen. n.

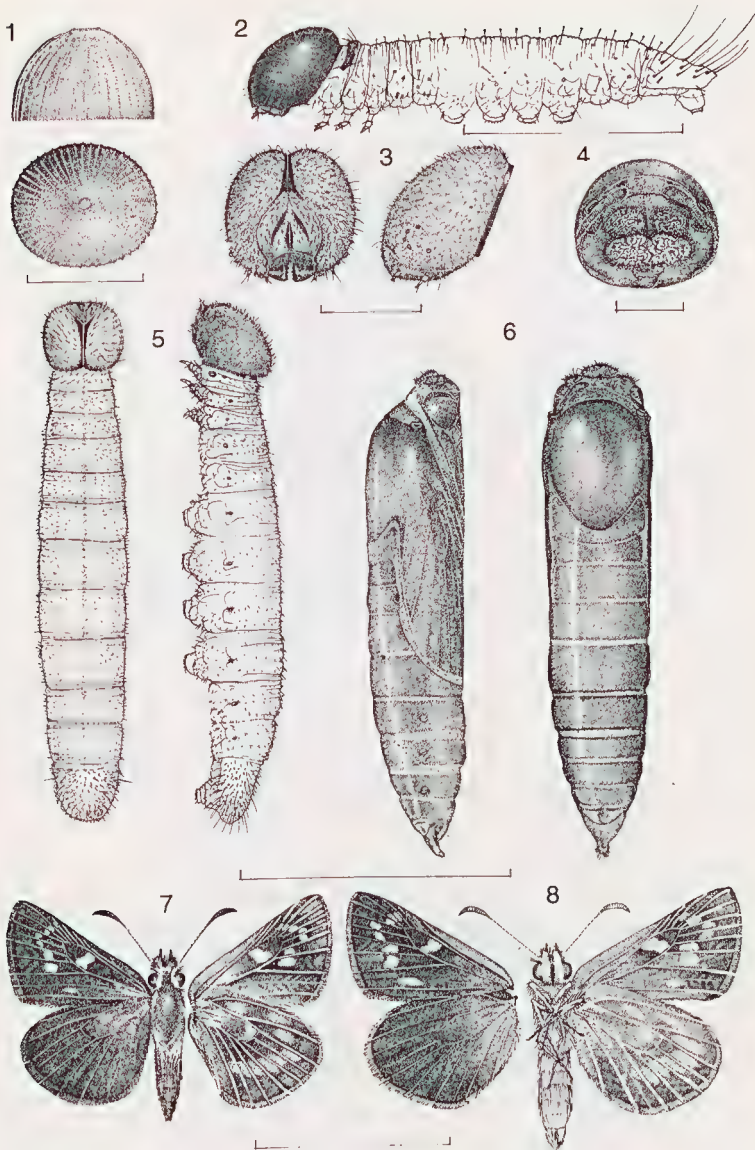
Type species: *Anisynta albovenata* Waterhouse, 1940, p. 5

#### Diagnosis

Adult (Figs 7, 8, 9, 12, 15, 18, 21); labial palpus (Fig. 24) with second and third segment long and slender; antenna short, with club (Fig. 15) broad with 17 segments (nudum = 13), evenly bent before half its length, white beneath; apiculus blunt, shaft chequered brown and white: fore-leg with short, oval epiphysis (Fig. 21); mid-leg and hind-leg (Fig. 18) each with one pair of tibial spurs; wing venation with forewing CuA2 closer to end of cell than to base, hindwing with M2 clearly defined, cubitus between CuA1 and M3 oblique: maculation (Figs 7, 8) with two subterminal forewing spots; underside with forewing veins in apical and terminal areas white-lined; hindwing with all veins lined with white on brown ground colour, paler areas between veins. Sex brand absent on upperside of male. Male genitalia (Fig. 9) with valvae distally constricted and protruding, upper edge of ventral section with harpe process; uncus short, blunt with hooked tip: female genitalia (Fig. 12) with broadly elliptical lamella postvaginallis; sterigma plates broadly bifid; lamella antevaginallis plate weakly developed; ductus bursae broad and short; corpus bursae spherical and without accessory pouch.

Juvenile (Figs 1-6): Egg (Fig. 1) large, elliptical in cross-section with 40-50 vertical fine ribs: larva (Figs 2, 3, 5); 1st instar (Fig. 2) with body pale yellow, covered with long clubbed setae and longer, plain setae on 1st segment and posterior segments; prothoracic plate dark brown; mature larva (Figs 3, 5) with body moderately elongate, pale yellowish-green, with darker dorsal line, head pale fawn with darker brown marking from dorsal area to frons, covered with long setae: pupa (Figs 4, 6) elongate, brown, posterior segments darker, smooth, cremaster short, slightly curved, anterior dark brown; operculum trifid, slightly raised, rounded and sclerotized, covered

\**Herimosa* = wilderness, hermit.



**Figs 1-8.** Juvenile stages and adults of *Herimosa albovenata weemala* (Couchman), all from Bredbo, NSW. (1) egg; (2) 1st instar larva; (3) final instar larval head; (4) frons and operculum of pupa; (5) final instar larva; (6) pupa; (7) adult male, upperside and underside; (8) adult female, upperside and underside. Scale bars: (1) = 1 mm, (2-4) = 2 mm; (5, 6) = 10 mm; (7, 8) = 15 mm.

with branched setae. Larval/pupal shelter an upright, loosely spun tube made from leaves and stems of foodplant (tussock grasses).

## Discussion

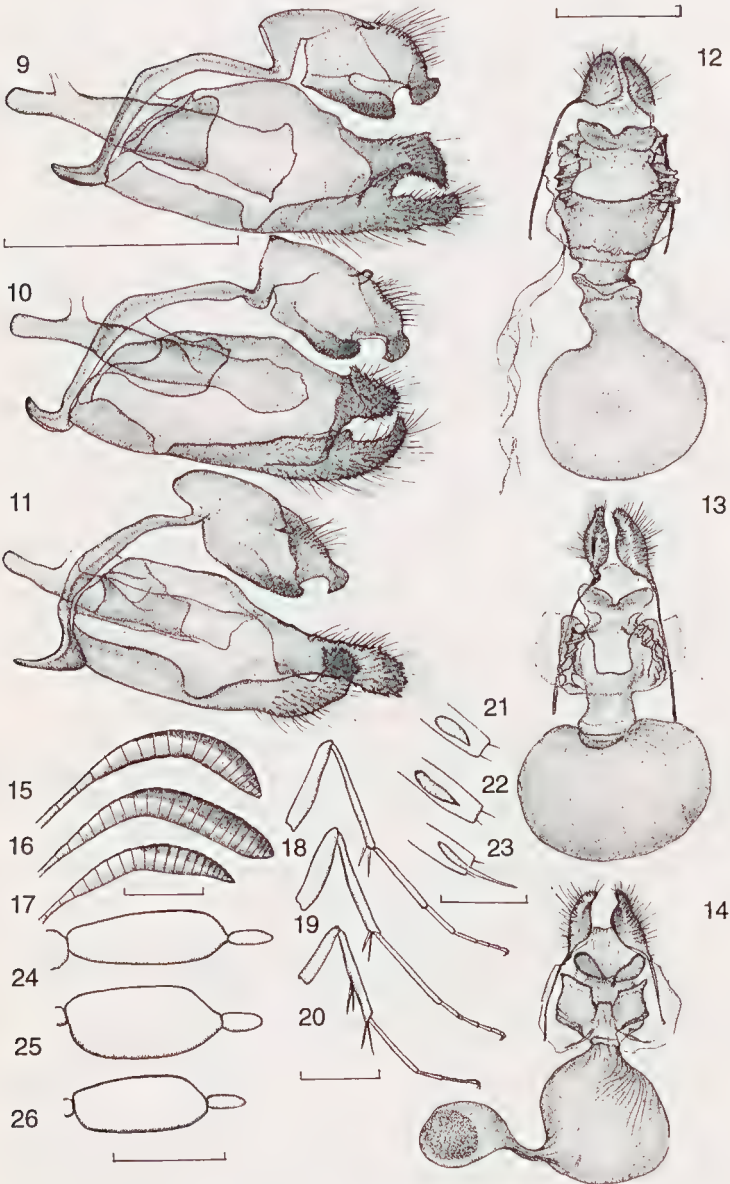
The species of *Anisynta* have a short, fairly stout body, and the fore-legs have a long epiphysis. The eggs are small and heavily ribbed. The elliptical and finely ribbed egg of *Herimosa* is similar to that of *Antipodia*. The larva is also similar to *Croitana* but is less active and the head more hairy. Structural similarities occur in the pupae of *Herimosa*, *Antipodia* and *Proeidosia*, particularly in the form of the slightly raised, granulated operculum. The lack of posterior pupal spines, the most distinctive feature of the *Proeidosia* group, is well evident in *Herimosa*.

Superficially, *Herimosa* appears to be quite unlike any genus in the *Proeidosia* group, but the well defined subterminal forewing spots show its true identity. The structural detail (male and female genitalia, configuration of tibial spurs, small epiphysis and larval/pupal morphology, especially elongate form and the lack of posterior pupal spines) places this taxon in the *Proeidosia* group, and close to *Croitana*. There may be reason to consider that *Herimosa* and *Croitana* are, in fact, cogenetic. However the structure of the egg, form of the antennal club, slender labial palpus, wing-shape, unusual hindwing maculation and the distinctive character of the female genitalia, makes placement of *albovenata* in a new genus more appropriate.

Morphology of the genitalic structures of *Herimosa* also provides convincing evidence for taxonomic affinity with *Proeidosia* and allied genera. Both male and female genitalia are similar to those of *Croitana*, and very dissimilar to those of all *Anisynta* species (Figs 9, 11, 12, 14; see also Atkins (1973) for comparison to *Anisynta/Pasma*, and Edwards (1979) for comparison to *Croitana*).

Character comparisons of adult and juvenile structures of *Anisynta*, the *Proeidosia* group and *Mesodina* Meyrick (allied to this group) provide further evidence of taxonomic affinities. The larval foodplant of *Anisynta*, *Proeidosia*, *Herimosa* and *Croitana* is Poaceae, that of *Antipodia* is Cyperaceae and that of *Mesodina* is Iridaceae. The egg of *Mesodina* is more

**Figs 9-26.** Comparative structures of *Herimosa albovenata weemala* (Couchman) from Bredbo, NSW, *Croitana croites* (Hewitson) from Western Australia and *Anisynta cynone gunneda* (Couchman) from Gunnedah, NSW. (9-11) male genitalia; (9) *H. a. weemala*; (10) *C. croites* (from Bunbury); (11) *A. c. gunneda*. (12-14) female genitalia; (12) *H. a. weemala*; (13) *C. croites* (from Cottesloe); (14) *A. c. gunneda*. (15-17) antennal clubs; (15) *H. a. weemala*; (16) *C. croites* (from Bunbury); (17) *A. c. gunneda*. (18-20) hind tibia; (18) *H. a. weemala*; (19) *C. croites* (from Bunbury); (20) *A. c. gunneda*. (21-23) fore tibia epiphysis; (21) *H. a. weemala*; (22) *Croitana croites* (from Bunbury); (23) *A. c. gunneda*; (24-26) Labial palpi; (24) *H. a. weemala*; (25) *Croitana croites* (from Bunbury); (26) *A. c. gunneda*. Scale bars: (9-20, 24-26) = 1 mm; (21-23) = 0.5 mm.



or less smooth, slightly ribbed in *Antipodia*, moderately to deeply ribbed in the other genera (*Anisynta* being extremely grooved). The larva of all species, except *Anisynta*, is tapered and, with the exception of *Croitana*, is somewhat inactive or 'sluggish' (but moderately so in *Herimosa* and *Anisynta*). The larva of *Mesodina* is covered with a white waxy powder. The pupa of all genera of the *Proeidosa* group and *Mesodina* is smooth, tapered with a characteristic, slightly raised operculum, and lacks posterior spines. Pupation in these genera occurs in a tube or tent-like shelter made within the foodplant, and with the exception of *Herimosa*, faces downward (transitional in *Croitana*).

The adult males of three species of *Anisynta* (*A. sphenosema*, *A. cynone* and *A. tillyardi*) and *Antipodia* have a sex-brand (or stigma) on the upperside of the forewing. The forewing of all species of the *Proeidosa* group have two additional apical spots. The third segment of the labial palpi are long. The antennal club of each genus differs in length and shape. It is bent and pointed in *Anisynta*, curved and pointed in *Proeidosa* and *Mesodina*, and more or less blunt and curved in the remaining genera. In three genera (*Croitana*, *Herimosa* and *Mesodina*) the mid-tibial spurs of the hindleg are absent.

Male genitalia of all these genera (except *Anisynta*) have a harpe process on the ventral section of the valva. The valva of the *Proeidosa* group is also distally constricted; and in *Anisynta* it is long and overlapping. With the exception of *Anisynta* and *Mesodina* all genera have a bifid tip to the uncus. The female genitalia of the *Proeidosa* group have a broad ductus bursa (caudal chamber), lack or have a weakly defined antevaginallis plate, and the accessory pouch is marginally developed (*Antipodia*) or absent. In *Anisynta* (and to a lesser extent, *Mesodina*) the ductus bursa is narrow and the accessory pouch is well developed.

The *Proeidosa* group is a diverse assemblage, characterised by the possession of generalised trapezitine character states. It may represent a stem group assemblage from which most of the genera of Trapezitinae have evolved.

The life cycle of the *Proeidosa* group is univoltine or bivoltine, with the exception of one species of *Antipodia*, in which the juvenile stage lasts two years. Habitats are more open biomes - often exposed, barren areas with extreme climates and temperature regimes. *Anisynta* prefers cool, moist areas; the juveniles usually occur in grassy swales and sheltered slopes.

#### **Definition of the *Proeidosa* group**

With the inclusion of *Herimosa*, the *Proeidosa* group of genera is defined as follows:

##### **Juveniles**

Egg large, with many fine, or several strong ribs, laid on sedges or grasses. Larva moderately elongate, tapered posteriorly, pale, semi-translucent,

lightly banded longitudinally on dorsal surface; head lightly sclerotized and shallow-grooved, covered with moderate to long setae, more or less banded with darker colour. Pupa moderately elongate, tapered; operculum reduced, barely protruding and trifid, but rounded and sclerotized; posterior segments smooth (without spines); cremaster unspecialised, short and weakly sculptured. Larva and pupa (with the exception of *Herimosa*) situated head-downward in conical shelters (transitional in *Croitana*).

### Adults

Second and third segments of labial palpus moderately long to long, antenna moderately short, club broad with apiculus moderately to very blunt and gradually curved to bent. Body elongate, clothed in simple setae, legs moderately short, tibial spur configuration 0-2-2 or 0-2-4; epiphysis short (except in *Antipodi*). Wings with two forewing sub-terminal spots, male forewing with or without sex-brand, forewing CuA2 placed midway between 1A+2A and CuA1 or closer to CuA1, hindwing with M2 moderately defined, cubitus between CuA1 and M3 slightly to moderately angled, Rs long (especially in female). Male genitalia with broad but distally constricted valvae, ventral section with harpe process present, uncus short, slightly rounded with small lateral processes and bifid at tip, laterally hook-shaped. Female with broad lamella postvaginalis, short but broad sterigma plates, lamella antevaginalis absent (except in *Herimosa* where it is very weakly developed), ductus bursae broad, leading to spherical or sub-spherical corpus bursae without (or weakly present) accessory pouch.

### Key to the *Proeidosa* group of genera

1. Fore tibia with small epiphysis; male without sex-brand ..... 2  
Fore tibia with long epiphysis; male with sex-brand ..... *Antipodia*
2. Hind tibia with one pair of spurs ..... 3  
Hind tibia with two pairs of spurs ..... *Proeidosa*
3. Antennal club sharply bent near base; underside of hindwing with  
mottled pattern ..... *Croitana*  
Antennal club evenly bent; underside of hindwing with veins  
bordered white ..... *Herimosa* gen. n.

### *Herimosa albovenata* (Waterhouse) comb. n.

(Figs 1, 8, 9, 12, 15, 18, 21)

### *Herimosa albovenata albovenata* (Waterhouse) comb. n.

*Anisynta albovenata* Waterhouse, 1940, p. 568; Evans, 1949, p. 211.

*Anisynta albovenata albovenata* Waterhouse; Common 1964, p. 16; McCubbin 1971, pp. 161, 162, fig. 6; Common & Waterhouse 1972, p. 90, pl. 21, fig. 7; Fisher 1978, p. 80, pl. 1, figs 11, 12; Common & Waterhouse 1981, p. 123, pl. 22, fig. 7; Dunn & Dunn, 1991, p. 211, fig. 142.

Types. SOUTH AUSTRALIA: Holotype ♂ 'Point Pierce, Yorke's Peninsula, South Australia, 13th Oct., 1940' in AM.; 3 ♀♀ paratypes (incl. 'AT') same data, in AM (all examined). The type locality is almost certainly Point Pearce, opposite Wardang Island, Yorke Peninsula, South Australia, where this skipper still occurs.

Distribution. SOUTH AUSTRALIA: South-eastern and south-central areas, from York Peninsula (Common & Waterhouse, 1981), Peterborough (Atkins, unpublished), and the Lower Murray Valley and Upper South-East to near the Victorian border (Fisher, 1978).

Food plant. *Stipa semibarbata* R.Br., and possibly *Danthonia* sp. (Poaceae).

***Herimosa albovenata fuscata* (Parsons) comb. n.**

*Anisynta albovenata fuscata* Parsons, 1965, p. 176, pl. 15, figs 5-8; McCubbin 1971, p. 161; Common & Waterhouse 1972, p. 90; Fisher 1978, p. 82; Common & Waterhouse 1981, p. 123; Dunn & Dunn 1991, p. 211.

Types. WESTERN AUSTRALIA: Holotype ♂ 'Salmon Gums, W. Austr., 12 Oct. 1963, No. 1. 19134', in SAM; 'Allotype' ♀ 'Esperance, W. Austr., 14th Oct. 1959' (both examined). Parsons designated approximately 29-32 paratypes which are probably all in the SAM, but these have not been examined:

Distribution. WESTERN AUSTRALIA: 40 km SE of Denham near Shark Bay, Wubin and Quairading, western districts of WA (Dunn & Dunn, 1991), north of Southern Cross (M. Williams, pers. comm.), and the Cocklebidly and Balladonia areas (R. Mayo, pers. comm.) to Salmon Gums and Esperance in eastern WA.

Foodplant. Not recorded, but probably tussock *Stipa* (Poaceae).

Variation. The type series from eastern Western Australia are larger than all other specimens of *albovenata* that I have seen.

***Herimosa albovenata weemala* (Couchman) comb. n.**

*Anisynta albovenata weemala* Couchman 1954, p. 78; Common 1964, pp. 16, 17, fig. 4; McCubbin 1971, p. 161; Common & Waterhouse 1972, p. 90; Fisher 1978, p. 82; Common & Waterhouse 1981, p. 124; Dunn & Dunn 1991, p. 211.

Types. NEW SOUTH WALES: Holotype ♂ labelled 'Gunnedah, N.S.W., 10th September, 1943, F.S. Paul'; 'Allotype' ♀ with same data, and an unidentified number of paratypes in the collection of L.E. Couchman (now in ANIC, not examined).

Distribution. NEW SOUTH WALES: Gunnedah district at c. 300 m, Mt Kaputar in the Nandewar Ranges at c. 600m, Bredbo district at c. 700 m.

Foodplant. *Stipa semibarbata* R.Br., *Stipa scabra* Lindl. and possibly *Poa* sp. (Poaceae).



## Biology

*Herimosa albovenata* is by no means a common insect. It occurs in the most local of biomes in which it favours barren, often windswept areas of tussock grassland, generally intersected by rocky limestone out-crops and undulating hills. The colonies are usually confined to small (sometimes 100m diameter) areas of exposed rocks and soil lying on the fringes of swales, hill slopes and shore-lines. The adults appear on the wing in small numbers at co-ordinated flight-times, but settle as soon as the sun is obscured. The skipper is univoltine, with a short flight-season of a few weeks in September and October.

On the wing, *Herimosa* may be mistaken for *Anisynta*. The flight is rapid and low, just above the tussocks, and very active. Both sexes will visit flowering herbs, and males 'patrol' areas near the foodplants and settle on the ground or low vegetation. When basking (generally on stones, leaf-litter and bare earth), the skipper half-spreads both wings towards the sun, but at rest, the wings are folded together over the thorax. *H. albovenata* only flies in spring, unlike the adults of *Anisynta* which occur in late summer or autumn. Other skippers occasionally found in the same habitats as *albovenata* are *Anisynta cynone* Hewitson and *Ocybadistes walkeri* Heron.

*Stipa semibarbata* and *S. scabra* seem to be the main larval foodplants. These wispy tussock grasses commonly grow in heavily textured red or red-brown marls containing nodules of limestone (Quick 1985). Although patchy in occurrence, these soils are widespread across southern Australia, a factor that probably contributes to the broad range of the skipper. The habitat vegetation often includes open duneheaths on the coast, and scattered mallee scrub and other mixed open *Eucalyptus* woodland at an elevation or inland.

The large egg is laid singly on the underside or upperside of a leaf-blade, but also occasionally on the stems of the foodplant. The first instar larva emerges within 12-14 days. Unlike *Anisynta* there appears to be no diapause before hatching. The young larva makes a simple silken shelter by drawing together leaf-blades, and feeds on the leaf-tips at night. Growth of the larva is slow, especially during winter, and the final (probably fifth) instar is reached by June or July the following year. The shelter at this stage is little more than a loosely bound, upright tube made within the stems of the foodplant. Pupation occurs in this final shelter, the pupal duration being 14-20 days. Both the larva and the pupa are orientated in an upright position within this shelter. I have occasionally found larvae parasitised by small, unidentified wasps.

## Acknowledgments

I thank Mr Hugh Bollam W.A.; Mr Ted Edwards, ANIC, Canberra; Mr Bob Fisher, S.A.; Mr Bob Hay, W.A., Mr Russel Mayo, N.S.W. and Mr Grant

Miller, N.S.W. for information, discussion and material relevant to the genus *Anisynta* and the *Proeidos* group.

## References

- ATKINS, A.F. 1973. A new genus *Proeidos* for an Australian skipper, *Pasma polysema* (Lower) (Lepidoptera: Hesperidae: Trapezitinae). *Journal of the Australian Entomological Society* **12**: 253-260.
- ATKINS, A.F. 1975. The life history of *Anisynta tillyardi* Waterhouse and Lyell (Lepidoptera: Hesperidae: Trapezitinae). *Australian Entomological Magazine* **2**: 72-75
- ATKINS, A.F. 1984. A new genus *Antipodia* (Lepidoptera: Hesperidae: Trapezitinae) with comments on its biology and relationships. *Australian Entomological Magazine* **11**: 45-58.
- ATKINS, A.F. and MILLER, C.G. 1987. The life history of *Croitana arenaria* Edwards, 1979 (Lepidoptera: Hesperidae: Trapezitinae). *Australian Entomological Magazine* **14**: 73-75.
- COMMON, I.F.B. 1964. *Australian Butterflies*. Jacaranda Press, Brisbane
- COMMON, I.F.B. & WATERHOUSE, D.F. 1972. *Butterflies of Australia*. Angus and Robertson, Sydney.
- COMMON, I.F.B. & WATERHOUSE, D.F. 1981. *Butterflies of Australia*. Revised Edition. Angus and Robertson, Sydney,
- COUCHMAN, L.E. 1954. Notes on some Tasmanian and Australian Lepidoptera Rhopalocera with descriptions of new forms and subspecies. *Papers and Proceedings of the Royal Society of Tasmania*. **88**: 67-79,
- DUNN, K.L. & DUNN, L.E. 1991. *Review of Australian Butterflies: distribution. Life history and taxonomy*. Part 2: Family Hesperidae. Privately published, Melbourne.
- EDWARDS, E.D. 1979. Two new species of *Croitana* Waterhouse (Lepidoptera: Hesperidae) from central Australia. *Australian Entomological Magazine* **6**: 29-33.
- EVANS, W.H. 1949. *A catalogue of the Hesperidae from Europe, Asia, and Australia in the British Museum (Natural History)*. London.
- FISHER, R.H. 1978. *Butterflies of South Australia (Lepidoptera: Hesperioidea. Papilionoidea)*. Woolman, Govt. Printer, South Australia.
- McCUBBIN, C.W. 1971. *Australian Butterflies*. Nelson, Melbourne.
- PARSONS, F.E. 1965. Notes on some Western Australian Lepidoptera-Rhopalocera with description of a new subspecies of *Anisynta albovenata*. *Records of the South Australian Museum* **15**: 175-177.
- QUICK, W.N.B. 1985. *Anisynta albovenata* in Victoria? *Victorian Entomologist* **15**: 56-57.
- WATERHOUSE, G.A. 1932. *What butterfly is that?* Angus and Robertson, Sydney,
- WATERHOUSE, G.A. 1940. Australian Hesperidae IX. Description of a new species. *Proceedings of the Linnean Society of New South Wales* **65**: 568.